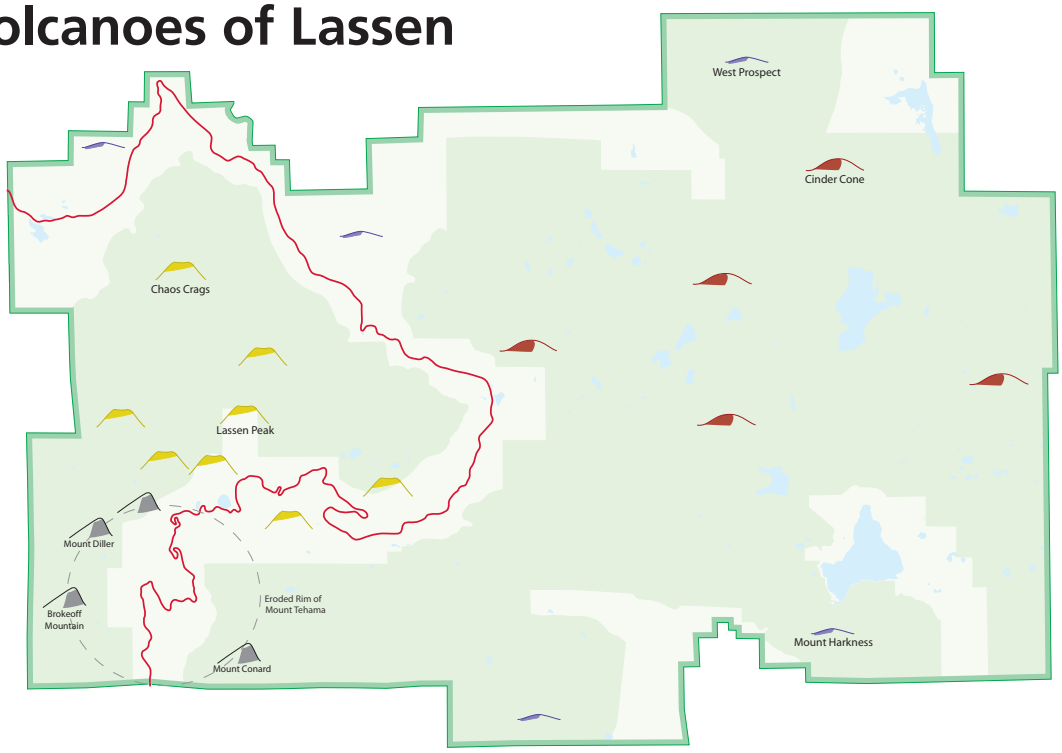
National Park Service
U.S. Department of the Interior

Lassen Volcanic National Park

Volcanoes of Lassen



Lassen Volcanic National Park lies at the southern end of the Cascade Range and at the western limit of the Basin and Range Province. This intersection of two very unique volcanic regions has led to a great diversity of geologic features within the park.

An Eruptive Story

This region has been volcanically active for roughly three million years. As the Juan De Fuca Plate continues to subduct beneath North America, more magma will continue to come to the surface to make new volcanoes. Lassen is one of only a few places in the world where all four types of volcanoes can be seen. Can you find an example of each type during your visit?

Cinder Cone

Cinder cone volcanoes are built by gasous lava particles violently ejected high into the air from a single vent, similar to a popcorn popper. The lava shatters into small fragments that solidify in the air and fall as cinders around the vent. As the cinders accumulate, they pile up to form a circular or oval shaped cone. Cinders, more properly known as scoria, are made of a low density basalt that has a bubbly or vesicular texture. As the lava cools quickly in the air, gases are trapped within the rock, creating this texture. Similar to pumice, some cinders will float. Most cinder cone volcanoes have bowl shaped craters at the summit and lava flows are commonly emited from their bases.

Cinders are very light in weight and shift easily under pressure when walked on.

Composite

Sometimes called stratovolcanoes, these are generally steep-sided symmetrical cones of large dimensions formed from multiple eruptions that deposit layers of lava, ash, and cinder—comparable to a tiered cake. This is the most well known type of volcano in the Cascade Range. Once standing over 11,000 ft (3,300 m) tall, Brokeoff Volcano—also known as Mount Tehama—has been eroded away by hydrothermal activity and glaciers over the past tens of thousands of years. Long ago, Brokeoff Mountain, Pilot Pinnacle, Mount Diller, and Mount Conard were all part of Mount Tehama. Today, these individual mountains are all that remain of the composite volcano.

Photo by Don DeBold 2012

Mount Tehama once covered an area approximately 13 miles (21km) wide. If standing today, the park highway would go straight through the center of the mountain.

Shield

Shield volcanoes are formed almost entirely of fluid lava that builds up gradually from thousands of lava flows—like layers of paint on a canvas. The build up creates a broad, gentle sloping cone with a profile like a viking shield—hence the name. The highly fluid lava flows, known as basalt lava, spread out over wide areas, then cool as thin, gently dipping sheets. The largest known volcanoes are shield volcanoes and include such famous examples as Mauna Loa volcano in Hawaii and the largest mountain in the solar system—Olympus Mons on Mars.

Shield volcanoes have a low profile, like Prospect Peak pictured above. Multiple shield volcanoes can give the illusion of rolling hills.

Plug Dome

Plug dome volcanoes are formed by non-explosive outpourings of viscous lava that piles up around a vent, but can be preceded or followed by explosive eruptions. Domes commonly occur within a crater or along the flanks of larger composite volcanoes. Growth occurs largely from within by expansion of lava that is too thick to flow. As it grows, the outer surface cools and hardens, then shatters, spilling lose fragments down its sides. At 10,457 ft (3187 m), Lassen Peak is one of the largest plug dome volcanoes on earth. A smaller dome formed inside Lassen's crater. During its last eruption, a large explosion shattered the dome causing hot blocks of lava to fall from the peak, creating the Devastated Area.

Lassen Peak is considered the most likely volcano in the Cascade Range to erupt in the coming century.